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Indian Standard

SAFETY FEATURES FOR GROUND POWER UNITS FOR DIRECT CURRENT AIRCRAFT SERVICING AND ENGINE STARTING

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Indian Standard

SAFETY FEATURES FOR GROUND POWER UNITS FOR DIRECT CURRENT AIRCRAFT SERVICING AND ENGINE STARTING

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 November 1975, after the draft finalized by the Aircraft Electrical Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 During the recent years there has been increasing demand of electrical equipment for use in aircrafts. To provide the necessary guidance regarding technical knowhow and other requirements such as minimum performance requirements consistent with optimum quality and uniform test methods, urgent need has been felt for standardization in this field.

0.3 Ground power units intended for use with aircraft which are subject to civil or military airworthiness requirements of India shall be subject to inspection and any directives issued from time to time by such statutory authorities.

0.4 This standard is based on ISO/R 223-1961 'Safety features for ground power units for dc aircraft servicing and engine starting', issued by the International Organization for Standardization.

1. SCOPE

1.1 This standard lays down the safety features for ground power units for direct current aircraft servicing and engine starting.

2. SAFETY FEATURES

2.1 Voltage Control — The ground power unit shall be capable of working continuously to develop the rated voltage within standard tolerance permissible for aircraft busbars specified in IS : 7854-1975*, under all normal environmental conditions. Precautions shall be taken to avoid pulsation of voltage supplied by the unit, and the ripple on dc supply shall be limited to a maximum of 2 volts from the average dc level.

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*Voltages and frequency for aircraft electrical systems.

2.2 Overvoltage Protection — A protective device shall be incorporated in the unit to automatically cut-off the main supply if sustained overvoltage occurs at any time at the unit busbar approaching a value of 110 percent of normal permissible busbar maximum voltage. There shall also be no fortuitous operation of the device at voltages below this figure.

2.3 Reverse Current Protection — Means shall be provided to safeguard against flow of reverse current from the aircraft to the unit. If unavoidable, the value of such reverse current permitted under any circumstances shall be limited to a maximum of 15 percent of the continuous rating of the unit, and there shall be no possibility of the generator motoring the prime-mover under any circumstances.

2.4 Reverse-Polarity Protection — Indications of correct polarity shall be permanently marked on the aircraft plugs and the ground supply sockets at points adjacent to the terminals. Means shall be provided to prevent inadvertant closing of the unit main switch if the switch is receiving a supply of reverse polarity from the unit generator.

2.5 Undervoltage Protection — Means shall be provided to prevent inadvertant closure of the main switch until the generator voltage has attained a voltage of at least 80 percent of the minimum permissible busbar voltage.

2.6 Emergency Safety Trip — The ground power unit shall be provided with a prominently located tripping device (coloured red for easy identification and within easy reach) to enable the operator to instantaneously switch off the main supply in the event of an emergency. The main switch and tripping device shall be designed in such a manner that an operator cannot inadvertantly, override the safety features.

2.7 Anti-arcing Protection — Means shall be provided to ensure that the main supply switch cannot remain in the closed position until the connection — ground-power unit to aircraft — has been made, and preferably, that, upon removal, the switch shall open before the main contacts are disconnected.

2.8 Panel Indication — Suitable instruments like moving coil voltmeters and charge/discharge ammeters shall be provided for each unit and service. It shall be ensured that their readings are clearly visible at all times of the day and night.

2.9 Socket-Connectors

2.9.1 Ground power supply socket-connectors for use with aircraft plugs shall comply with IS : 7915-1976*. Each of the main current carrying pins and sockets and contacts of the plugs and sockets (as distinct from any cables connected to them) shall be capable of safely carrying the following currents:

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*Dimensions for connections for aircraft ground electrical supplies.

> 450 A continuously (that is, for one hour or more), and 1 500 A for at least one minute duration. Each of the control pins and socket contacts shall be capable of carrying 35 A continuously.

2.9.2 They shall be robust in construction and capable of withstanding heavy mechanical shocks and hard wear and tear in use. The materials used shall be resistant to the action of aviation fuel, hydraulic-fluids, lubricating oils, cleaning and de-icing fluids.

2.9.3 All the contacts of the socket in the ground power units shall be detachable and capable of being replaced.

2.10 Radio Noise Suppression — The emission of noise likely to affect radio operation shall be satisfactorily suppressed.

2.11 Earthing — The chassis of the ground supply unit shall be effectively grounded, for example, through one or more non-ferrous earthing chains. The negative terminal of the unit shall normally be connected to the frame of the unit.

2.12 Fire Prevention — All units using internal combustion engines, shall incorporate an efficient spark-arrester in the engine exhaust system. All ground supply units shall be provided with a fire extinguisher adequate to deal with any fire supported by any breakage in the units fuel pipeline.

2.13 Flasher Light — Flasher light with a switch to indicate that the unit is ' ON ' shall be provided.

2.14 Parking Light — Two parking lights one at the front and one at the back shall be provided.

3. DATA

3.1 The undermentioned data shall be clearly displayed on the unit:

a) Busbar voltage or voltages,
b) Continuous rating or ratings of the unit,
c) Permissible one minute peak-output in amperes and volts,
d) Reference to this Indian Standard, and
e) Safety precautions.

INDIAN STANDARDS ON AIRCRAFT ELECTRICAL EQUIPMENT

IS:

2032 (Part XV)-1976	Graphical symbols used in electrotechnology: Part XV Aircraft electrical symbols
7854-1975	Voltages and frequency for aircraft electrical systems
7855-1975	Form of declaration of performance of aircraft electrical equipment
7856-1975	Safety features for ground power units for direct current aircraft-servicing and engine-starting
7857-1975	Aircraft-fuel nozzle grounding plugs and sockets
7915-1975	Dimensions for connections for aircraft ground electrical supplies

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- Batteries
- Cinematographic equipment
- Conductors and cables
- Domestic electrical appliances
- Electric welding equipment
- Electrical installations, codes of practice
- Electrical instruments
- Electron tubes and valves
- Electronic components
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